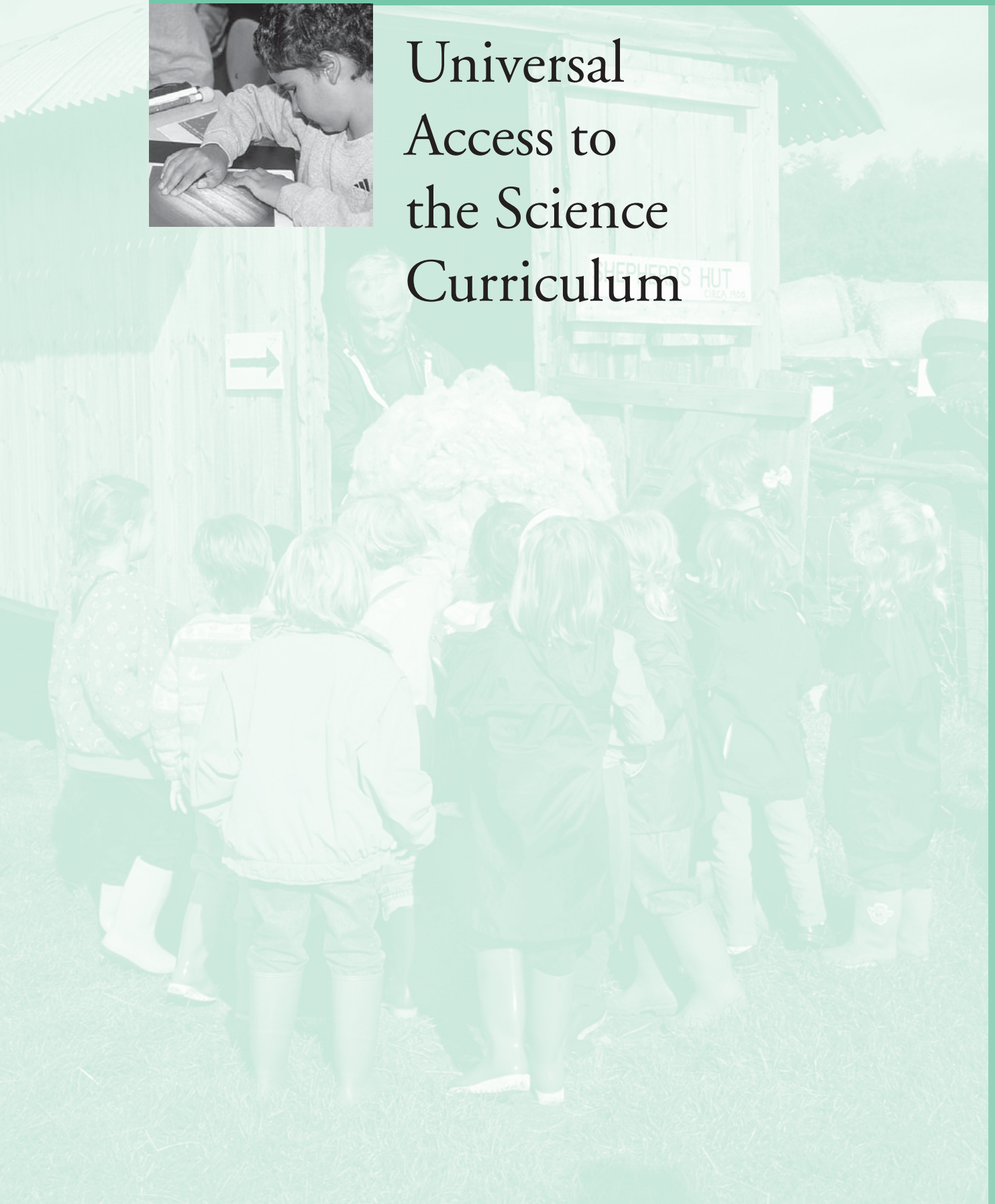




# Universal Access to the Science Curriculum





## Universal Access to the Science Curriculum

Science education is intended for all students. Academic instruction must be designed so that each student has the opportunity to master the science standards that provide systematic and coherent access to this challenging subject. Toward that end, this chapter discusses all students' needs to develop basic skills and academic language. It addresses the special needs of English learners and students with disabilities in their quest to master the standards, including those in the Investigation and Experimentation strand. The chapter also emphasizes that advanced learners need to be given meaningful assignments that extend the depth and breadth of their understanding of the standards.

### Science and Basic Skills Development

The acquisition of scientific knowledge and ideas requires foundational and fundamental skills in English-language arts and mathematics. Students pursuing the science content reflected in the standards and described in this framework need to master the grade-level standards in English-language arts and mathematics. The standards for both science and English-language arts call for students to read and compre-

hend informational text and write grammatically correct expository essays. Because of the strong relationship between mastery of basic skills in reading, writing, and mathematics and mastery of science content, teachers must reinforce application of those skills in science instruction. Teachers must also ensure that students learn to use scientific terminology correctly and develop academic language (as discussed more fully below).

### Academic Language Development

Studying science involves acquiring a new vocabulary and learning that some familiar words may have different meanings in science. This aspect of scientific literacy needs to be taught explicitly in order to minimize misconceptions that might otherwise arise from word usage in differing environments. For example, the terms *control* and *theory* have different definitions in common use compared with scientific use. Students will also begin to acquire new terms that have Latin and Greek roots, prefixes, and suffixes. An understanding of root words and affixes will not only improve vocabulary but also increase students' ability to comprehend words they have not encountered

before. For example, students will come to know that *biology* is a combination of *bio-*, derived from the Greek word for life, and *-logy* (also rooted in Greek), meaning study.

## English Learners

Support for English learners may consist of the preteaching of essential elements of scientific vocabulary. Instruction for English learners in the academic language of science is critical and must be specifically designed, planned, and taught. It includes direct instruction and experiences for students in English phonology, morphology, syntax, and semantics, and it must support students as they move toward proficiency in the academic language of science. The Investigation and Experimentation strand provides an additional opportunity for teachers to reinforce English learners' understanding of the academic language of science.

In the *Reading/Language Arts Framework* English learners are classified as follows:<sup>1</sup>

- Students in kindergarten through grade two
- Students in grade three through twelve who are literate in their primary language
- Students in grades three through twelve who have limited prior academic experience or literacy in their primary language

The biggest challenge in the teaching of science is addressing the needs of English learners in the latter two groups. Students in grades three through twelve who have strong literacy skills in their primary language

can be expected to transfer many of those skills to English and to progress rapidly in learning the academic language of science. Students in grades three through twelve with limited prior schooling will require intensive support in learning the academic language of science.

## Advanced Learners

Ensuring mastery of the science standards through challenging and enriched instruction is the goal for advanced learners. Students who readily understand the basic underpinnings of the standards pursue a richer understanding of standards-based science content. Advanced learners in kindergarten through grade eight must be encouraged to extend their knowledge of science through the enrichment opportunities included in state-adopted instructional materials. Enrichment lessons have high levels of standards-based science content proportionate to the amount of time that the lessons take. For example, advanced learners are encouraged to explore the history of a scientific concept or a complex method of experimentation. Enrichment projects need to be designed so that the student does most of the work in the classroom.

## Students with Disabilities

Students with disabilities are provided with access to all the content standards through a rich and supported program that uses instructional materials and strategies that best meet their needs. A student's 504 accommodation plan<sup>2</sup> or individualized education program (IEP)<sup>3</sup> often includes suggestions

for a variety of techniques to ensure that the student has full access to a program designed to provide him or her with mastery of the science standards, including those in the Investigation and Experimentation strand. Teachers must familiarize themselves with each student's 504 accommodation plan or IEP to help the student in achieving mastery of the science standards.

There are numerous ways in which a teacher can implement accommodations in science instruction. Disabilities vary widely, and accommodations must be tailored to the student's individual and unique needs. Some accommodations help ensure safety while the students participate in investigation and experimentation activities. Examples of some simple safety accommodations are as follows:

- Use of tape with a textured surface to help visually impaired students locate buttons and knobs
- Insulation of exposed hot pipes to protect a student who lacks sensation in the lower extremities and who would likely be in a wheelchair
- Benches at an appropriate height for wheelchair access
- Facilities for emergency showers and eyewashes accessible to wheelchair users

Labels may be printed in larger fonts for low-vision students. Because of the incidence of red-green color-blindness in some male students, instructions and safety notices are not to be red-green color coded, and chemical indicators must not be of the type that change from red to green. Details of laboratory instructions and protocols need to be written for students with hearing impairments or with auditory processing disorders. The following measures may be taken to help all children, especially those with sequencing disabilities or attention deficit disorder: printed instructions detailing each step of a laboratory exercise, checklists to indicate whether each step has been accomplished, and color coding information.

Educators may visit the following Web sites to obtain resources for understanding and addressing the needs of students with disabilities:

- "California Special Education Programs: A Composite of Laws Database," *Education Code*, Part 30, Other Related Laws, and *California Code of Regulations, Title 5* at <<http://www.cde.ca.gov/spbranch/sed/lawsreg2.htm>>.
- *A Composite of Laws, 2002, 24th Edition*. (To order a copy contact CDE Press at [800] 995-4099 or visit the Department Web site <<http://www.cde.ca.gov/spbranch/sed/compodr.htm>>).

**Notes**

1. *Reading/Language Arts Framework for California Public Schools, Kindergarten Through Grade Twelve*. Sacramento: California Department of Education, 1999, p. 233.
2. A Section 504 accommodation plan is a document typically produced by school districts in compliance with the requirements of Section 504 of the federal Rehabilitation Act of 1973. The plan specifies agreed-on services and accommodations for a student who, as the result of an evaluation, is determined to have a “physical or mental impairment [that] substantially limits one or more major life activities.” In contrast to the federal Individuals with Disabilities Education Act (IDEA), Section 504 allows a wide range of information to be contained in a plan: (1) the nature of the disability; (2) the basis for determining the disability; (3) the educational impact of the disability; (4) necessary accommodations; and (5) the least restrictive environment in which the student may be placed.
3. An IEP is a written, comprehensive statement of the educational needs of a child with a disability and the specially designed instruction and related services to be employed to meet those needs. An IEP is developed (and periodically reviewed and revised) by a team of individuals, including the parent(s) or guardian(s), knowledgeable about the child’s disability. The IEP complies with the requirements of the IDEA and covers such items as (1) the child’s present level of performance in relation to the curriculum; (2) measurable annual goals related to involvement and progress in the curriculum; (3) specialized programs (or program modifications) and services to be provided; (4) participation with nondisabled children in regular classes and activities; and (5) accommodation and modification in assessments.



# Professional Development





## Professional Development

Students of science deserve to be taught by teachers who have both the scientific knowledge and teaching ability to provide skillful instruction. The professional development of teachers is important to raise the quality of science instruction and ensure that science instruction is aligned with the content standards that are the basis of the state assessment system. Professional development programs serve many different types of teachers, but all such programs must strive for improved student achievement as the primary objective. To that end programs must be focused on science instruction at each teacher's specific grade level or content strand (e.g., physics, chemistry, biology/life sciences, earth sciences) and the standards associated with that grade level or strand.

Teachers' collegiate backgrounds vary. Therefore, the professional development needs of an elementary school teacher who may not possess a baccalaureate degree in science will certainly differ from the needs of a single-subject high school chemistry teacher who may have a graduate degree in chemistry. Although some teachers may need to be briefed only on the changes in science that have occurred since their postsecondary-level study, others may

lack even basic knowledge of science. Programs must be designed for both types of teachers and provide them with the breadth and the depth of knowledge that are required to support successful standards-based science teaching. As explained in the report of the Glenn Commission, "High-quality teaching requires that teachers have a deep knowledge of subject matter. For this there is no substitute."<sup>1</sup> The standards are the best organizing device for professional development programs and need to be at the center of any planning effort.

For kindergarten through grade eight, the State Board of Education adopts instructional materials after a careful review by panels of expert scientists and teachers. Professional development programs that work with elementary and middle school teachers need to provide them with specific training in the use of the state-adopted instructional materials that have been locally selected. State-adopted instructional materials reflect the best practices for instruction aligned with the content standards and provide:

- Comprehensive coverage of the science content in the standards
- Sequential organization that allows teachers to convey the science content efficiently and effectively

- Strategies for assessment of students
- Information and ideas that address the needs of special student populations
- Information on instructional planning and support

These materials also provide curricular units with investigations and experiments that have clear procedures and explanations of the underlying concepts behind the state standards. The programs have been reviewed to ensure that they support understanding of the standards and that activities demonstrate scientific principles, produce meaningful data, and can be safely and inexpensively conducted.

The State Board of Education does not adopt instructional materials for grades nine through twelve, but local educational agencies may use many of the State Board-approved criteria for evaluating materials at the high school level in physics, chemistry, biology/life sciences, and earth sciences. For example, high school texts need to provide accurate and up-to-date science content and use scientific vocabulary correctly. Standards-based laboratory and field activities need to build investigative skills and judgment, logical thinking, and understanding of scientific principles. The instructional program needs to help teachers evaluate the progress of students toward measurable goals and ensure that students master the content standards. Professional development programs that serve teachers in grades nine through twelve should include examples of outstanding instructional materials that are aligned with the *Science Content Standards*.<sup>2</sup>

Teachers with single-subject credentials in science may have baccalau-

reate degrees in the subject or subjects they are teaching, may have completed a substantial number of collegiate units in the subjects, may have qualified by successful passage of challenge examination(s), or may have any combination of these qualifications. Currently, the minimum requirements by the Commission on Teacher Credentialing for single-subject credentials in science include a breadth of course work in biology, chemistry, geoscience, and physics in addition to a depth of course work that is focused on one of those areas. Additional information about state credentialing for teaching may be obtained at the Web site of the commission <<http://www.ctc.ca.gov>>. Where possible, science teachers need to be encouraged to work with scientists in industry and postsecondary institutions. Toward this end many companies and collegiate science departments are broadening their outreach to schools and teachers.

## What Is Professional Development?

Professional development means “a planned, collaborative, educational process of continual improvement for teachers”<sup>3</sup> that helps them to develop the following proficiencies:

- Enhance their capacity to help students master the standards, using State Board of Education-adopted instructional materials that have been selected locally for students in kindergarten through grade eight or are aligned with the standards (grades nine through twelve).<sup>4</sup>
- Deepen their knowledge of the subject(s) they are teaching.

- Sharpen their teaching skills in the classroom.
- Keep up with developments in their fields.
- Increase their ability to monitor students' work, so they can provide constructive feedback to students and appropriately redirect their own teaching.

Professional development programs should not expect teachers to develop their own curriculum units or use “hand-me-down” units that have been informally produced. Those units may not have been adequately reviewed for accuracy by content experts, or they may inadvertently include activities that are unsafe. Teaching is a challenging job that needs to be skillfully performed by professionals. Similarly, curriculum development requires a special type of expertise. The standards-based accountability system in California is a new experience for many teachers, and ensuring that every child receives a standards-based education is a challenge. Teachers need to have outstanding programs developed so that they can be assured that all the content material is covered comprehensively and in the appropriate sequence.

## Who Should Teach the Teachers?

The ultimate goal of professional development is to improve students' academic performance. To that end it is essential that the faculty of a professional development program be experts themselves in the science content called for in the standards. In designing a professional development program, organizers need to seek the help of col-

legiate faculty in academic science departments and the professional scientists in industry. Although many academic scientists are busy professionals, they are also committed to serving the schools in their communities and may even have children in public schools. Whenever possible, scientists need to be more than just visiting speakers. Professional development programs must be logical and coherent in organization, and collegiate-level scientists can play a key role in their successful design.

Individuals who are not experts in science should not be called upon to teach teachers. Just as students deserve to have competent instruction and standards-aligned curricular materials, so too do their teachers deserve to have the very best program of development. Nonscientists can play significant and important supportive roles in a professional development program and should be used in ways that add to the success of the teachers.

## When Is a Program Aligned with the Science Content Standards?

Professional development programs need to focus on the content that teachers are called on to teach. It is important that teachers know the background underlying the standards and know how the content is applied in more advanced study. Teachers must be knowledgeable about a wide range of examples that illustrate the standards they are helping students to master and the models that can be used in the presentation of those standards. Experimental activities used in the process must provide a clear demonstration of the content being studied

and be built on a solid foundation of prior knowledge.

Elementary and middle school teachers need to be trained specifically in the grade-level standards applicable to their classes. A fifth-grade teacher, for example, would receive minimal benefit from a program designed for second-grade teachers. Similarly, single-subject teachers in middle and high schools need to be developed as experts in their teaching fields. An understanding of the standards will provide teachers with knowledge of what has been taught to their students in previous grades and what will be taught to their students in future grades, but this concern is secondary to the current needs of their students. Professional development must always be highly focused on the grade level (or subject specialty) of the teacher, not be a holistic study of the standards for many grades (or content strands), a course that lacks necessary depth.

## When Is a Professional Development Program Deemed Successful?

The academic achievement of students must be the main indicator of

success in professional development programs. An effective program of professional development is one in which adequate attention is paid to classroom follow-up. Program organizers need to track the extent to which teachers apply what they have learned in the classroom and observe how the professional development lessons are implemented.

## How Will Tomorrow's Science Teachers Be Developed?

Today's teachers need to encourage students (at the elementary, middle, and high school levels) who are interested in science to pursue both collegiate study and careers in teaching. Moreover, students now completing baccalaureate degrees in science need to be directed toward teaching, and transitions to the field of teaching need to be facilitated for individuals who are contemplating midcareer changes and who have professional experience in science. Only through this multifaceted approach can the demands for science teachers be met for forthcoming generations.

### Notes

1. *Before It's Too Late: A Report to the Nation from the National Commission on Mathematics and Science Teaching for the 21<sup>st</sup> Century*. Washington, D.C.: U.S. Department of Education, 2000.
2. *Science Content Standards for California Public Schools, Kindergarten Through Grade Twelve*. Sacramento: California Department of Education, 2002.
3. *Before It's Too Late*.
4. Ibid.



# Criteria for Evaluating K–8 Science Instructional Materials



# Criteria for Evaluating K–8 Science Instructional Materials

Adopted by the California State Board of Education  
March 10, 1999

In October 1998, the California State Board of Education adopted Science Content Standards for Grades K–12 (referred to as the Standards) that describe what students should know and be able to do at each grade level. The Standards define the essential skills and knowledge in science that will enable California students to compete with their peers around the world.

The Standards are written for each grade K through 8 and in one span for grades 9–12. The content within each grade or span is organized into strands. The strands for grades K–5 are Earth Sciences, Life Sciences, Physical Sciences, and Investigation and Experimentation. After 5th grade, the content has been organized in concentrations as follows: 6th grade: Focus on Earth Science; 7th grade: Focus on Life Science; 8th grade: Focus on Physical Science. Standards from other strands are included in grades 6, 7, and 8 that support the concentration at each of these grade levels. The Investigation and Experimentation strand appears for each of the middle school grades. The 9–12 Standards are organized as follows: Physics, Chemistry, Biology/Life Sciences, Earth Sciences, and Investigation and Experimentation.

Students should have the opportunity to learn science by direct instruction, by reading textbooks and supplemental materials, by solving Standards-based problems, and by doing lab investigations and experiments. At each grade level for grades K through 8, a list of essential and progressively more sophisticated investigation and experimentation standards is included. These investigation and experimentation standards should be integral to, and directly and specifically support, the teaching of the Life, Physical, and Earth Science standards at the time the material is taught.

For the 9–12 grade span, one Investigation and Experimentation strand is included and should be woven into the teaching of Life, Physical, and Earth Sciences throughout that grade span.

This document provides criteria for evaluating the alignment of instructional materials with the Standards and the quality of those materials in four additional areas (program organization, assessment, universal access, and instructional planning and support). These criteria will guide the development and govern the adoption of K–8 instructional materials in 2000 and the interim adoption in 2003 or

2004. These criteria do not recommend nor require one particular pedagogical approach. The numerical order of the criteria within each category does not imply their relative importance. These criteria may also be used by publishers and local educational agencies as a guide for the development and selection of instructional materials for grades 9–12.

These criteria are organized into five categories:

1. Science Content/Alignment with Standards: the content as specified in the California Science Standards.
2. Program Organization: the sequence and organization of the science program.
3. Assessment: the strategies presented in the instructional materials for measuring what students know and are able to do.
4. Universal Access: the information and ideas that address the needs of special student populations, including students eligible for special education, advanced students, students whose English language proficiency is significantly lower than that typical of the class or grade level, and students whose achievement is either significantly below or significantly above that typical of the class or grade level.
5. Instructional Planning and Support: the instructional planning and support information and materials, typically including a separate edition specially designed for use by the teacher, that assist teachers in the implementation of the science program.

Science materials must support teaching aligned with the Standards. Materials that fail to meet the science content criteria will not be considered satisfactory for adoption. Only those programs determined to meet criterion category 1 need to be evaluated under criteria categories 2–5.

In an effort to create focused science instructional materials, publishers are asked to concentrate on the content as described in the Standards. They are encouraged to include hands-on investigations and experimentation. To the extent that a program includes content that is extraneous to instruction in the standards, it may do so if the extraneous content is not fundamentally contrary to any of the standards and it does not detract from the ability of teachers to teach readily and students to learn thoroughly the content specified in the standards.

### **Criteria Category 1: Science Content/Alignment with Standards**

Instructional materials support teaching and learning the skills and knowledge called for at each grade level in the Standards. Materials are fully aligned with the science topics in the K–8 Standards; however, the order of the science standards does not imply an organization for the materials.

To be considered suitable for adoption, instructional materials in science will provide:

1. A list of evidence, with page numbers and/or other appropriate references that demonstrates alignment with the Standards.

2. That all content Standards as specified at each grade level are supported by topics or concepts, lessons, activities, investigations, examples, and/or illustrations, etc., as appropriate.
3. Accurate content with examples drawing upon scientific evidence and up-to-date science research to support science concepts, principles, and theories.
4. Science content that is presented in interesting and engaging ways to students.
5. Scientific terms and academic vocabulary appropriately used and accurately defined.
6. Investigations and experiments with clear procedures and explanations of underlying concepts, principles, and theories, integral to and supportive of the teaching and learning of the Life, Physical, and Earth Science standards, so that investigative and experimental skills are learned in the context of those content standards.
7. Investigations and experiments that focus on demonstrating scientific principles in the content area, will in practice produce meaningful data, and can be safely and inexpensively conducted.
8. Investigations and experiments that develop investigative skills and judgment, logical thinking, and understanding of scientific principles, and develop the ability to gain knowledge through observation, inquiry, and experiment with attention to organization, interpretation, and presentation of data.
9. Opportunities for students to increase their knowledge of science through study of the historical development of scientific thought and examples of the lives, work, and contributions of scientists if they contribute to the understanding of the Standards.
10. Opportunities for students to study connections between science and technology that support understanding of the Standards, including societal impacts/issues, and the interdependence and distinction between technology and science.
11. For each grade, practice in the use of mathematics to quantify relationships and solve science problems using mathematics up to and including grade level as defined in the California Mathematics Standards.
12. Reading and writing expository text aligned with the appropriate State standards.

Criteria categories 2–5 shall be considered as a whole, with each program passing or failing the criteria as a group. A program may have weaknesses in several of the areas identified in criteria 2–5, but, on balance, be determined worthy of adoption. Conversely, though having strengths in several of the areas of evaluation, a program may have so glaring a weakness in a single area of evaluation as to be determined not worthy of adoption.

#### **Criteria Category 2: Program Organization**

Sequential organization of the science program provides structure concerning what students should learn each year and allows teachers to convey the science content efficiently and effectively. The content will be well organized and presented in

a manner consistent with providing all students an opportunity to achieve the essential knowledge and skills described in the Standards.

To be considered suitable for adoption, instructional materials in science should provide:

1. Instructional resources, aligned with the Standards, that introduce new concepts at a reasonable pace and depth of coverage and explicitly prepare students to master content at each later grade.
2. The organization of a science program in a logical and coherent structure which facilitates efficient and effective teaching and learning within a lesson, unit, and year aligned with the Standards.
3. Clearly stated student outcomes and goals that are measurable and standards-based.
4. An overview of the content in each chapter or unit which outlines the scientific concepts and skills to be developed.
5. A well-organized structure that provides students with the opportunity to understand scientific concepts, principles, and theories and builds upon a foundation of facts, investigative skills, and scientific inquiry.
6. A variety of investigations and experiments, problems and applications, that organize the content in the grade level in a logical way, such that prerequisite skills and knowledge are developed before the more complex concepts, principles, and theories which depend on them.
7. Tables of contents, indices, glossaries, content summaries, and assessment guides that are designed to help teachers, parents/guardians, and students.

### **Criteria Category 3: Assessment**

Assessment should measure what students know and are able to do. Instructional resources should contain multiple measures to assess student progress. Assessment measures should reveal students' knowledge of scientific concepts, principles, theories, and skills as well as the ability to apply their knowledge to understanding advanced concepts, principles, and theories. Assessment tools that publishers include as part of their instructional material should provide evidence of students' progress toward meeting the Standards and should provide information teachers can use in planning and modifying instruction to help all students meet or exceed the Standards.

To be considered suitable for adoption, instructional materials in science should provide:

1. Strategies or instruments teachers can use to determine students' prior knowledge.
2. Multiple measures of individual student progress at regular intervals to evaluate attainment of grade-level knowledge and understanding of scientific concepts, principles, theories, and skills.
3. Guiding questions for monitoring student understanding during investigations.
4. Performance assessments and accompanying rubrics students can use to evaluate and improve the quality of their own work.

#### **Criteria Category 4: Universal Access**

Instructional materials should provide access to the Standards-based curriculum for all students, including those with special needs: English language learners, advanced learners, students with learning difficulties, and special education students. Programs must conform to the policies of the State Board, as well as other applicable state and federal guidelines, pertaining to diverse populations and students with special needs.

To be considered suitable for adoption, instructional materials in science should provide:

1. Suggestions based on current and confirmed research for ways to adapt the curriculum and the instruction to meet students' assessed special needs.
2. Strategies to help students who are below grade level in science.
3. Strategies to help students with reading difficulties understand the science content.
4. Suggestions for advanced learners that are tied to the Standards and that allow students to study content in greater depth.

#### **Criteria Category 5: Instructional Planning and Support**

Teacher support materials should be built into the instructional materials and should specify suggestions and illustrative examples of how teachers can implement a Standards-based science program. Assistance should be designed to help the teacher implement the program in a way that ensures the opportunity for all students to learn the essential skills and knowledge called for in the Standards. These criteria do not recommend or require one particular pedagogical approach. Publishers should make recommendations to teachers regarding instructional approaches that fit the instructional goals. Programs should provide teachers with a variety of instructional approaches which might include, but are not limited to, direct instruction, assigned reading, demonstrations, hands-on and inquiry-based investigations.

To be considered suitable for adoption, planning and support resources in science should provide:

1. Clearly written and accurate explanations of concepts, principles, and theories understandable by teachers.
2. Examples of students' common misconceptions of the scientific concepts and strategies to address and correct the misconceptions.
3. A variety of pedagogical strategies for flexible grouping of students.
4. Lesson plans and suggestions for organizing resources in the classroom and ideas for pacing lessons.
5. A list of required equipment and supplies that support the Standards-based program.
6. Economical equipment and supplies with recommendations for their use (included with the materials) and/or recommendations for using and obtaining alternative materials and equipment that are inexpensive and readily obtainable.

7. Suggestions and information to promote classroom safety in doing hands-on investigations, experiments, and demonstrations. Instructions for safe and effective use of required equipment, materials, and supplies called for by the program, along with clear instructions for using and maintaining the equipment should also be included.
8. Suggestions for how to use student assessment data within the program for instructional planning purposes.
9. Technical support and suggestions for appropriate use of instruments or tools, audiovisual, multimedia, and information technology resources associated with a unit.
10. Suggestions for activities and strategies to inform parents/guardians about the science program.
11. References and resources for the teacher, to provide further study of scientific content.
12. Demonstration electronic resources (e.g., videos, CDs) for teachers at each grade level, depicting appropriate laboratory techniques, experiments, and teaching suggestions.
13. Homework assignments that support classroom learning, written so that parents/guardians can easily help their children.
14. Suggestions that are tied to the Standards and that allow students to study content in greater depth.



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## Appendix

# Requirements of the *Education Code*

California's *Education Code* contains a number of provisions that have a bearing on science education in this state. The actual text of the statutes is not included in this appendix because actions of the Legislature and the Governor periodically add to, delete from, or otherwise modify the requirements of law.

Teachers, school administrators, parents (guardians), and others who use this framework are encouraged to become familiar with pertinent provisions of the *Education Code*. For the current text of the statutes, please go to the *California Law* Web site <<http://www.leginfo.ca.gov/calaw.html>>.

Examples of *Education Code* provisions pertinent to science education (including health and safety concerns) are as follows:

- **Chapter 2 of Part 1 (commencing with Section 200). Educational Equity.** Includes a requirement that teachers endeavor to impress upon the minds of pupils the meaning of equality and human dignity, including kindness toward domestic pets and the humane treatment of animals.
- **Chapter 1 of Part 19 (commencing with Section 32200). School Safety – Public and Private Institutions.** Includes a requirement that eye protective devices be provided for teachers and students under certain conditions and that snakebite kits be supplied for some field trips.
- **Chapter 2.3 of Part 19 (commencing with Section 32255). Pupils' Rights to Refrain from the Harmful or Destructive Use of Animals.** Includes a requirement that pupils who have moral objections to harming or destroying animals be given alternative education projects under certain circumstances.
- **Chapter 6.6 of Part 27 (commencing with Section 49091.10). The Education Empowerment Act of 1998.** Includes establishment of the right of parents (guardians) to inspect instructional materials and observe instruction.
- **Chapter 2 of Part 28 (commencing with Section 51200). Required Courses of Study.** Includes requirements for the courses of study to be offered and the minimum courses needed for high school graduation.
- **Part 33 (commencing with Section 60000). Instructional Materials and Testing.** Includes establishment of specific controls on state and local adoptions of instructional materials and of penalties for teachers (and other school officials) receiving things of value from publishers.